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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/866,854	05/30/2001	Jebu Jacob Rajan	1263.1750	7263

5514 7590 04/14/2005

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EXAMINER	
LERNER, MARTIN	

ART UNIT	PAPER NUMBER
2654	

DATE MAILED: 04/14/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/866,854	RAJAN, JEBU JACOB	
	Examiner	Art Unit	
	Martin Lerner	2654	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *08 December 2004 and 27 December 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1 to 69* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *29 to 31 and 61 to 63* is/are allowed.

6)☒ Claim(s) *1 to 13, 22 to 28, 33 to 45, 54 to 60, and 65 to 68* is/are rejected.

7)☒ Claim(s) *14 to 21, 32, 46 to 53, 64, and 69* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *11/04, 1/05, 2/05*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

Applicant's election with traverse of Group I, Claims 1 to 28, 32 to 60, and 64 to 66 in the reply filed on 08 December 2004 is acknowledged. The traversal is on the grounds that the two groups of claims are closely related and a proper search of the claims of one group would likely include a search of the claims of the other group. This is found persuasive because the two groups of claims are linked by claims 32, 64, and 69, which are found to be allowable. Independent claims 1, 33, and 67 are directed to a memory storing probability densities for determining a quality measure of a received audio signal. Independent claims 29 and 61 are directed to determining a quality measure of an input audio query with annotation data. However, claims 25, 32, 57, 64, 68, and 69 link Groups I and II, so claims of Group II would be rejoined if any of linking claims 25, 32, 57, 64, 68, and 69 were found to be allowable. Here, claims 32, 64, and 69 are found to be allowable if rewritten in independent form, so both Groups I and II will be examined.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 44 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 44 is a method claim depending upon claim 31, which is an apparatus claim. Claim 44 should depend upon claim 33, not claim 31.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1 to 4, 6, 8 to 10, 12 to 13, 22 to 23, 25, 33 to 36, 38, 40 to 42, 45, 54 to 55, 57, and 65 to 68 are rejected under 35 U.S.C. 102(b) as being anticipated by *Scholz et al.*

Regarding independent claims 1, 33, and 67, *Scholz et al.* discloses an apparatus and method for assessing an error rate of a communication channel, comprising:

"storing a predetermined function which gives, for a given set of audio signal values, a probability density for parameters of a predetermined audio model which is assumed to have generated the set of audio signal values, the probability density defining, for a given set of model parameter values, the probability that the predetermined audio model has those parameter values, given that the model is

assumed to have generated the set of audio signal values" – known probability density functions are stored (column 11, line 67 to column 12, line 7); digital signals can be voice signals ("audio signal values") (column 1, lines 16 to 22); an estimate of the probability density function for the channel or link is obtained by categorizing decision variables into threshold categories and comparing the estimated probability density function with stored known probability density functions (Abstract); a probability density function k has model parameter values (column 13, line 50 to column 16, line 43);

"receiving a set of audio signal values representative of an input audio signal at a receiver" – digital communication receiver consists of an antenna 1, RF stage 2, and demodulator for receiving a digital signal (column 9, line 67 to column 10, line 7: Figure 2); digital signals can be voice signals ("audio signal values") (column 1, lines 16 to 22);

"applying the set of received audio signal values to said stored function to give the probability density for said model parameters for the set of received audio signal values" – a decision variable extractor 3 obtains a measured histogram to estimate a probability density function of the communication link (column 10, lines 1 to 18: Figure 2);

"processing said function with said set of received audio signal values applied, to derive sample parameter values from said probability density" – each time the decision variable is interpreted by the decoder 34, the value of the analogue to digital converter is assessed as to which category it falls to form a measured histogram for the link probability density function (column 12, lines 34 to 41); over a number of symbol periods, a communication link probability density function is estimated; the histogram is

an accumulation of occurrence of decision variables being categorized in a particular category (column 10, lines 31 to 39);

"analyzing at least some of said derived samples of parameter values to determine a measure of the variance of said at least some of said samples of parameter values" – microprocessor 39 compares the measured histograms for the communication link, stored in the values of the computer variable for each category, with stored histograms of probability density functions (column 12, lines 42 to 48); incoming decision variables are sorted into categories by dividing the probability space into regions by boundaries (column 111, lines 13 to 49); the regions of probability space define "a measure of the variance" of the samples;

"outputting a signal indicative of the quality of the received audio signal values in dependence upon said determined variance measure" – computing and comparison stage 8 provides a bit error rate signal 9 as an output (column 10, lines 5 to 7); a bit error rate signal is a measure of the quality of the received signal.

Regarding claims 2 to 4, 6, and 34 to 35, *Scholz et al.* discloses incoming decision variables are sorted into categories by dividing the probability space into regions by boundaries (column 111, lines 13 to 49); the regions of probability space define "a measure of the variance" of the samples; estimates of the communication link probability density function are counted over a number of symbol periods, where a histogram is an accumulation of occurrence decision variables (column 10, lines 30 to 41).

Regarding claims 8 to 10, 36, 38, and 40 to 42, *Scholz et al.* discloses receiving symbols over a number of symbol periods ("a sequence of sets of signal values") (column 10, lines 31 to 40); implicitly, symbols are discrete in time, and "non-overlapping"; a histogram is an accumulation of occurrence of decision variables approximating the probability function for a given set of symbol periods (column 10, lines 31 to 40), a histogram is an "initial estimate" of signal values as more signal values are received; a bit error rate ("quality measure") is obtained for signal values (column 12, lines 41 to 48).

Regarding claims 12 to 13 and 45, *Scholz et al.* discloses a bit error rate is associated with noise affecting the link and a signal to noise ratio (column 1, lines 12 to 17; column 2, lines 17 to 29); thus, parameters of a probability density function measure noise; digital signals can be voice signals ("an input speech signal") (column 1, lines 16 to 22).

Regarding claims 22 to 23 and 54 to 55, *Scholz et al.* discloses a microprocessor 39 compares the measured histogram for the communication link with stored histograms of the probability density functions (column 12, lines 41 to 48).

Regarding claims 25, 57, and 68, *Scholz et al.* discloses using a bit error rate to construct performance profile maps of signal strength at given geographical locations for mobile digital radio applications (column 18, line 63 to column 19, line 2); a performance map of signal strength is "annotation data" for a received signal and a quality measure.

Regarding claims 65 and 66, *Scholz et al.* discloses a microprocessor for performing the instructions for decision maker 86, computing and comparison stage 8.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 5, 11, 37, and 43 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Scholz et al.* in view of *Rajan et al. ("Bayesian approach to parameter estimation . . .").*

Scholz et al. omits using a Gibbs sampler for parameter estimation of an auto-regressive process model, but *Rajan et al.* teaches Gibbs sampling is a reasonable scheme for estimating a time-varying autoregressive process for audio signals with a flexible model. (Abstract) It would have been obvious to one having ordinary skill in the art to utilize Gibbs sampling of an autoregressive process as taught by *Rajan et al.* in parameter estimation of *Scholz et al.* for the purpose of providing a flexible model of a time-varying process.

Claims 7, 26 to 28, 39, and 58 to 60 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Scholz et al.* in view of *Weerackody et al.*

Scholz et al. suggests category cumulative probability density functions (column 12, lines 52 to 56), but does not expressly disclose determining a quality measure from a weighted sum of samples, or providing audio annotation for speech recognition to derive words, phonemes, and a word lattice. However, *Weerackody et al.* teaches an apparatus and method for obtaining accuracy probabilities of decoded features for speech recognition to improve performance under adverse channel conditions. (Column 2, Line 53 to Column 3, Line 4) Accuracy probabilities are "annotation data". Implicitly, speech recognition involves identifying words and phonemes from hidden Markov models, which are word lattices. *Weerackody et al.* also teaches a soft weighting feature, where each speech feature is weighted by a confidence level of accurate decoding. (Column 11, Line 54 to Column 12, Line 51) It is stated that "soft feature decoding" provides dramatic improvements in automatic speech recognition performance under adverse channel conditions. (Column 3, Lines 5 to 16) It would have been obvious to one having ordinary skill in the art to provide audio annotation for speech recognition and a quality measure from a weighted sum of samples as taught by *Weerackody et al.* in the apparatus and method for error rate monitoring of *Scholz et al.* for the purpose of obtaining improved performance of speech recognition under adverse channel conditions.

Claims 24 and 56 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Scholz et al.* in view of *Vary et al.*

Scholz et al. discloses measuring a bit error rate during decoding, but omits encoding signals in dependence upon a bit error rate. However, *Vary et al.* teaches a method of encoding a signal, where encoding is performed for more sensitive bits to increase error robustness. (Column 1, Lines 40 to Column 2, Line 14) It would have been obvious to one having ordinary skill in the art to encode signals in dependence upon a quality measure as suggested by *Vary et al.* in the apparatus and method for error rate monitoring of *Scholz et al.* for the purpose of increasing error robustness.

Allowable Subject Matter

Claims 29 to 31 and 61 to 63 are allowed.

Claims 14 to 21, 32, 46 to 53, 64, and 69 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

The prior art made of record and not relied upon is considered pertinent to Applicant's disclosure.

Nowack et al. and Cellier et al. disclose related art.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Martin Lerner whose telephone number is (571) 272-7608. The examiner can normally be reached on 8:30 AM to 6:00 PM Monday to Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richemond Dorvil can be reached on (571) 272-7602. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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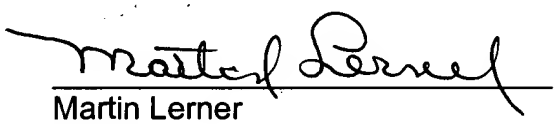

Martin Lerner
Examiner
Group Art Unit 2654